INDIAN PACING AND ELECTROPHYSIOLOGY JOURNAL 15 (2015) 259–260

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/IPEJ

Catheter ablation of atrial tachycardia in a patient with extracardiac Fontan repair: The utility of transaortic approach and pulmonary artery recording

Hussam Ali [a,*], *Maria Cristina Tavera* [b], *Sara Foresti* [a], *Riccardo Cappato* [c]

[a] *Arrhythmia & Electrophysiology Unit II, Humanitas Gavazzeni Clinics, Bergamo, Italy*
[b] *Department of Cardiovascular Disease, Siena University Hospital, Siena, Italy*
[c] *Arrhythmia & Electrophysiology Research Center, Humanitas Clinical & Research Center, Rozzano MI, Italy*

ARTICLE INFO

Article history:
Available online 12 February 2016

Keywords:
Extracardiac Fontan
Atrial tachycardia
Catheter ablation
Transaortic approach
Pulmonary artery

This case concerns a 19-year-old male with complex congenital heart disease consisting of tricuspid atresia, transposition of the great arteries, atrial septal defect (ASD) and pulmonary stenosis. He underwent multiple surgical operations, and finally a total cavo-pulmonary connection with an *extracardiac non-fenestrated* Goretex conduit. Due to recurrent episodes of atrial tachycardia, catheter ablation was planned and cardiac MRI was obtained to clarify this complex anatomy prior to the procedure.

A diagnostic catheter placed in the left pulmonary artery (PA) was successfully used for atrial recording/pacing, and reentrant atrial tachycardia was reproducibly induced by programmed atrial stimulation. Due to the marginal hemodynamic status during tachycardia, we didn't utilize electroanatomical mapping and we performed rapid conventional mapping seeking mid-diastolic potentials and applying entrainment maneuvers when possible. The bipolar atrial electrogram recorded by the PA catheter was used as a stable electrical reference for activation mapping and to identify the electrical diastole window.

The ablation catheter was advanced to the atria using a transaortic approach and tachycardia was successfully mapped and ablated at the right lateral wall where low-amplitude mid-diastolic potentials were recorded (Fig. 1). At 1-year follow-up, the patient remained asymptomatic off antiarrhythmic drugs.

Commentary

This case outlines the technical challenges as the transaortic approach represented the available percutaneous access to the atria due to the extracardiac location of the conduit. This required crossing of the aortic and mitral valves, and, for right atrial mapping, the ASD. RAO fluoroscopy projection was used to advance the ablation catheter through the aortic valve and successively, once accessing the single ventricle, a large loop was obtained to support advancing the catheter posteriorly through the mitral valve to the atria (Fig. 1C). Finally, guided by LAO fluoroscopy projection, an additional curvature of the catheter was performed to cross the large ASD and to reach the area of interest at the right lateral atrial wall (Fig. 1B).

* Corresponding author. Arrhythmia & Electrophysiology Unit II, Humanitas Gavazzeni Clinics, Via M. Gavazzeni 21, 24125 Bergamo, Italy. Tel.: +39 0354204005; fax: +39 0282246453.
E-mail address: hussamali.ep@gmail.com (H. Ali).
Peer review under responsibility of Indian Heart Rhythm Society.
http://dx.doi.org/10.1016/j.ipej.2016.02.002

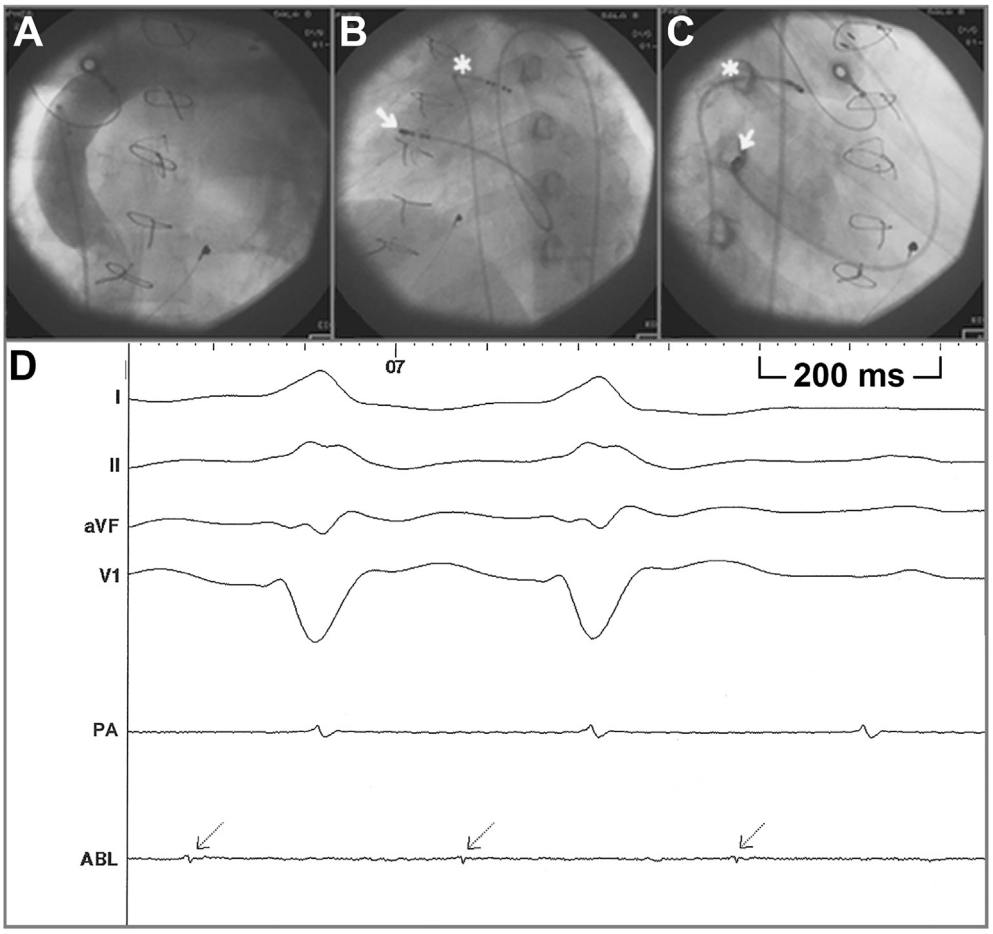

Fig. 1 – A) Postero-anterior projection of angiogram of the extracardiac conduit confirming the absence of fenestration. B and C) Left and right anterior oblique (45°) radiograms, respectively, show the successful ablation site at the lateral right atrial wall. The arrow indicates the tip of the ablation catheter, and the asterisk indicates the PA catheter. D) During tachycardia, bipolar recording at the successful ablation site (ABL) showed low-amplitude, mid-diastolic potentials (dotted arrows).

Entrainment attempts at the successful ablation site failed to capture the local tissue at maximum pacing output. However, entrainment from the adjacent areas demonstrated relatively short post-pacing intervals (~40 ms longer than tachycardia cycle length) indicating proximity to the tachycardia circuit. Limited "focal" radiofrequency ablation at the area showing mid-diastolic activity interrupted the tachycardia and rendered it not inducible anymore. Additional "insurance" lesions were subsequently applied around the anatomic site of successful ablation (total of 5 applications).

The more invasive trans-conduit/baffle puncture might be an option in patients after Mustard/Senning and lateral tunnel-Fontan operations, but it is more challenging after extracardiac Fontan repair [1].

Moreover, electrophysiologists should keep in mind the utility of the PA as a reliable alternative site for atrial recording/pacing in exceptional cases [2].

Disclosures/Conflict of interests

None.

REFERENCES

[1] Aoki H, Nakamura Y, Takeno S, Takemura T. A new procedure for a trans-conduit puncture by grasping the dilator tip with a snare catheter: an alternative access method during catheter ablation of supraventricular tachycardias after an extracardiac Fontan operation. Heart Rhythm 2014;11:1492–4.

[2] Breithardt G, Seipel L. Recording of left atrial potentials from pulmonary artery in man. Br Heart J 1980;43:689–94.